

# INTERNATIONAL SEARCH REPORT

International Application No  
**PCT/EP2004/051953**

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C08F291/00 C08F271/00 C08F285/00 C08F265/00 C08F267/00  
B01D53/00 B01J20/00 A61M1/36 A61K39/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C08F A61L C09D A01N C09C C07K B01D B01J C07C A61M B32B C09B  
G02F A61F A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.   |
|------------|--|-------------------------|
| X          | US 5 556 708 A (HOERL HANS-HEINRICH ET AL) 17 September 1996 (1996-09-17)  | 1-8,<br>10-21,<br>23-29 |
| Y          | * claims 1 "amino", 4, 14, 13, 17; col. 5, line 42-46 "amino"; col. 1, line 8-12, 48-51, 36-38; col. 3, line 4-30; col. 13, line 34-39; col. 6, line 15-col. 7, line 17; col. 9, line 10-col. 10, line 62; examples*<br>column 16, lines 31-39               | 30, 31                  |
| X          | WO 01/92359 A (FORSCH PIGMENTE UND LACKE E V ; SCHMIDT FRIEDRICH GEORG (DE); KERN) 6 December 2001 (2001-12-06)<br>* abstract ; claims 1, 4, 5, 6, 7, 9 ; page 9, line 7 - page 10, line 5 ; example 2 *<br>page 6, line 21 - page 7, line 3<br>-----<br>-/- | 1-26                    |

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the International filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the International filing date but later than the priority date claimed

- \*T\* later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

Date of the actual completion of the International search

7 December 2004

Date of mailing of the International search report

11/01/2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax (+31-70) 340-3016

Authorized officer

Hammond, A

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/051953

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No.               |
|------------|--|-------------------------------------|
| X          | US 5 967 714 A (HILL FRANK ET AL)<br>19 October 1999 (1999-10-19)<br>* abstract ; claims 1,2,6,7,11 ; column 4,<br>line 4-21 ; column 3, line 27-33 ; column<br>4, line 63-64 ; column 5, line 8-10 "blood<br>bags, drainages"*<br>-----                       | 1-13,27                             |
| X          | US 5 476 509 A (HOBOT CHRISTOPHER M ET<br>AL) 19 December 1995 (1995-12-19)<br>* claims 1,7,8,9 ; example 6 ; column 4,<br>line 51 - column 6, line 1 ; column 2,<br>line 42-48 ; column 1, line 65 - column 2,<br>line 15 *<br>column 4, lines 35-45<br>----- | 1-6,8,<br>10,27                     |
| X          | US 5 215 692 A (HOERL HANS-HEINRICH ET<br>AL) 1 June 1993 (1993-06-01)<br><br>* claims 1,35-39,30 ; column 7, line 15-22<br>; column 7, line 50 - column 8, line 68 ;<br>column 22, line 49-55 ; column 11, line 67<br>*<br>-----                              | 1-6,8,<br>10-19,<br>21,<br>23-26,29 |
| Y          | WO 01/23413 A (GAMBRO DIALYSATOREN)<br>5 April 2001 (2001-04-05)<br>* page 5, line 17-19 ; page 5, line 22 -<br>page 6, line 2 ; figures 1 and 2 *<br>abstract; claims 6-26<br>-----   | 30,31                               |
| A          | WO 91/13098 A (RISOE FORSKNINGSCENTER)<br>5 September 1991 (1991-09-05)<br>* claims 10,11,13,15,16,22-56 ; page 5,<br>line 21-23, 29-31 *<br>page 7, lines 12-20<br>-----  | 1-31                                |
| A          | WO 01/19878 A (KOSSMANN BEATE ;CREAVIS<br>TECH & INNOVATION GMBH (DE); OTTERSBACK<br>PE) 22 March 2001 (2001-03-22)<br>page 1, lines 8-13; claims 1-24<br>-----  | 1-31                                |
| A          | US 5 344 560 A (SUGO TAKANOBU ET AL)<br>6 September 1994 (1994-09-06)<br>* abstract ; claims *   | 1-31                                |
| A          | EP 0 052 156 A (TORAY INDUSTRIES)<br>26 May 1982 (1982-05-26)<br>page 4, lines 25-31; claims 1-10<br>-----   | 1-31                                |
| A          | US 6 096 800 A (HILL FRANK ET AL)<br>1 August 2000 (2000-08-01)<br>abstract; claims 1-13<br>-----  | 1-31                                |
|            | -/-  |                                     |

# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/051953

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| A          | US 4 097 420 A (COUPEK JIRI ET AL)<br>27 June 1978 (1978-06-27)<br>* claims 1,3 ; column 1, line 68 - column<br>2, line 4 *<br>abstract | 1-31                  |
| A          | EP 0 109 531 A (GAMBRO LUNDIA AB)<br>30 May 1984 (1984-05-30)<br>* abstract ; page 2, line 16-34 *                                      | 30,31                 |
| A          | EP 0 278 100 A (GAMBRO AB)<br>17 August 1988 (1988-08-17)<br>* abstract ; claims 40-45, 1-39 *  | 30,31                 |

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2004/051953

### Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-13

A separating material PRODUCABLE by - (a) providing a solid substrate, having amino-functional groups coupled to the substrate surface ; (b) covalently coupling of the amino-functional groups with a thermally labile radical initiator ; (c) contacting the substrate surface with a solution of polymerisable monomers under conditions, where thermally initiated graft copolymerisation of the monomers takes place, to form a structure of adjacent functional polymer chains on the surface of the substrate.

---

2. claims: 14-26

A method for the production of an independent / unspecified separating material as detailed in application claim 14.

---

3. claims: 27-28

The use for the extracorporeal treatment of blood, or blood plasma, or blood serum, or (for claim 27) the extracorporeal removal of endotoxins of septic patients, of a separating material of any of claims 1-13.

---

4. claim: 29

The use for affinity adsorption, or ion exchange adsorption, or hydrophobic adsorption, or hydrophilic adsorption, or affinity adsorption applications, of a separating material of any of claims 1-13.

---

5. claim: 30

A separating column product comprising beads of a separation material of any of claims 1-13 and whereby the beads are of a size and packing as detailed in application claim 30.

---

6. claim: 31

A separating cartridge product comprising a tube, multiple hollow fibre membranes, fitted tube ports, and membranes of certain pore size as detailed in application claim 31.

---

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No  
PCT/EP2004/051953

| Patent document<br>cited in search report |   | Publication<br>date | Patent family<br>member(s)   | Publication<br>date  |
|---|---|---------------------|--|--|
| US 5556708                                | A | 17-09-1996          | DE 4028326 A1<br>DE 59009071 D1<br>WO 9103506 A1<br>EP 0490940 A1  | 14-03-1991<br>14-06-1995<br>21-03-1991<br>24-06-1992   |
| WO 0192359                                | A | 06-12-2001          | AU 6744401 A<br>WO 0192359 A1  | 11-12-2001<br>06-12-2001   |
| US 5967714                                | A | 19-10-1999          | DE 19709075 A1<br>AT 219881 T<br>CA 2231101 A1<br>DE 59804617 D1<br>DK 862858 T3<br>EP 0862858 A1<br>JP 10251350 A<br>NO 980981 A<br>US 6203856 B1 | 10-09-1998<br>15-07-2002<br>06-09-1998<br>08-08-2002<br>14-10-2002<br>09-09-1998<br>22-09-1998<br>07-09-1998<br>20-03-2001 |
| US 5476509                                | A | 19-12-1995          | US 5344455 A<br>US 5545213 A<br>DE 69333425 D1<br>DE 69333425 T2<br>EP 0596615 A1<br>JP 2691854 B2<br>JP 7016291 A                                 | 06-09-1994<br>13-08-1996<br>01-04-2004<br>02-12-2004<br>11-05-1994<br>17-12-1997<br>20-01-1995                             |
| US 5215692                                | A | 01-06-1993          | DE 3929648 C1<br>DE 59001328 D1<br>WO 9103310 A1<br>EP 0490950 A1  | 29-11-1990<br>03-06-1993<br>21-03-1991<br>24-06-1992   |
| WO 0123413                                | A | 05-04-2001          | US 6774102 B1<br>AT 260294 T<br>CA 2383955 A1<br>DE 60008565 D1<br>EP 1220868 A1<br>ES 2213604 T3<br>WO 0123413 A1<br>JP 2003511354 T              | 10-08-2004<br>15-03-2004<br>05-04-2001<br>01-04-2004<br>10-07-2002<br>01-09-2004<br>05-04-2001<br>25-03-2003               |
| WO 9113098                                | A | 05-09-1991          | AU 7454491 A<br>WO 9113098 A1  | 18-09-1991<br>05-09-1991   |
| WO 0119878                                | A | 22-03-2001          | DE 19943344 A1<br>DE 19952222 A1<br>AU 6690300 A<br>CA 2384427 A1<br>WO 0119878 A1<br>EP 1228112 A1<br>JP 2003509546 T                             | 15-03-2001<br>03-05-2001<br>17-04-2001<br>22-03-2001<br>22-03-2001<br>07-08-2002<br>11-03-2003                             |
| US 5344560                                | A | 06-09-1994          | JP 2954275 B2<br>JP 4016219 A  | 27-09-1999<br>21-01-1992   |
| EP 0052156                                | A | 26-05-1982          | EP 0052156 A1<br>DE 3069379 D1   | 26-05-1982<br>08-11-1984   |
| US 6096800                                | A | 01-08-2000          | DE 19709076 A1   | 10-09-1998   |

# INTERNATIONAL SEARCH REPORT



Information on patent family members



International Application No

PCT/EP2004/051953

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s)   | Publication<br>date  |
|---|---------------------|--|--|
| US 6096800                                | A                   | AT 220291 T<br>CA 2231120 A1<br>DE 59804706 D1<br>DK 862859 T3<br>EP 0862859 A1<br>JP 10251340 A<br>NO 980980 A<br>US 2001007694 A1  | 15-07-2002<br>06-09-1998<br>14-08-2002<br>28-10-2002<br>09-09-1998<br>22-09-1998<br>07-09-1998<br>12-07-2001   |
| US 4097420                                | A 27-06-1978        | CS 177507 B1<br>AT 338702 B<br>AT 101875 A<br>AT 622176 A<br>AT 348945 B<br>AU 7814675 A<br>CA 1045291 A1<br>CH 619246 A5<br>CH 619245 A5<br>CS 200353 B1<br>CS 195162 B1<br>DE 2505870 A1<br>FR 2260588 A1<br>GB 1493986 A<br>GB 1504117 A<br>JP 1220504 C<br>JP 58051006 B<br>JP 58132004 A<br>JP 1220505 C<br>JP 58051007 B<br>JP 58132005 A<br>JP 1200669 C<br>JP 50115185 A<br>JP 58033018 B<br>NL 7501616 A ,B,<br>SE 409330 B<br>SE 7501330 A | 29-07-1977<br>12-09-1977<br>15-12-1976<br>15-07-1978<br>12-03-1979<br>12-08-1976<br>26-12-1978<br>15-09-1980<br>15-09-1980<br>15-09-1980<br>31-01-1980<br>14-08-1975<br>05-09-1975<br>07-12-1977<br>15-03-1978<br>26-07-1984<br>14-11-1983<br>06-08-1983<br>26-07-1984<br>14-11-1983<br>06-08-1983<br>05-04-1984<br>09-09-1975<br>16-07-1983<br>14-08-1975<br>13-08-1979<br>20-10-1975 |
| EP 0109531                                | A 30-05-1984        | DK 513983 A<br>EP 0109531 A1<br>JP 59108560 A<br>SE 8206520 A  | 17-05-1984<br>30-05-1984<br>23-06-1984<br>17-05-1984   |
| EP 0278100                                | A 17-08-1988        | AT 78178 T<br>AU 595423 B2<br>AU 1134788 A<br>BR 8800439 A<br>CA 1286284 C<br>DE 3780440 D1<br>DE 3780440 T2<br>DE 8718135 U1<br>DE 278100 T1<br>EP 0278100 A2<br>ES 2023079 T3<br>JP 2753242 B2<br>JP 63194666 A<br>KR 9508519 B1<br>SE 8700461 A<br>SE 467142 B  | 15-08-1992<br>29-03-1990<br>11-08-1988<br>20-09-1988<br>16-07-1991<br>20-08-1992<br>17-12-1992<br>30-04-1997<br>27-02-1992<br>17-08-1988<br>01-12-1993<br>18-05-1998<br>11-08-1988<br>31-07-1995<br>07-08-1988<br>01-06-1992   |

# INTERNATIONAL SEARCH REPORT



Information on patent family members



International Application No

PCT/EP2004/051953

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------------------|----------------------------|---------------------|
| EP 0278100                                | A                   | SE 8702234 A               | 07-08-1988          |
|   |                     | US 4784495 A               | 15-11-1988          |